4. The Diameter of the hole I put $\frac{1}{4}$ of an inch *N.* 80, *p.* 3077, and placed the Priſm cloſe to it, even ſo cloſe as to be contiguous, *N.* 80, *p.* 3077, *lin.* 4, 5. But yet there needs no curioſity in theſe circumſtances. The hole may be of any other bigneſs, and the Priſm at a diſtance from the hole, , provided things be ſo ordered, that the light appear of a round form, if intercepted perpendicularly at its coming out of the Priſm. Nor needs there any curioſity in the *day*. The clearer it is the better; but if it be a little cloudy, that cannot much prejudice the Experiment, ſo the Sun do but ſhine diſtinctly through the cloud.

Theſe things being thus ordered, if the refracted light fall perpendicularly on a wall or paper at 20 foot or more from the Priſm, it will appear in an oblong form, croſs to the axis of the Priſm, *red* at one end, and *violet* at the other; the length five times the breadth (more or leſs according to the quantity of the refraction,) the ſides, ſtreight lines, parallel to one another, and the ends confuſed, but yet ſeeming ſemi-circular.

I hope therefore, Mr. *Linus*'s Friends will not entertain themſelves any further about incongruous *ſurmiſes*, but try the Experiment as Mr. *Gaſcoin* has promiſed. And then, ſince Mr. *Gaſcoin* tells you, That *the Experiment being of it ſelf extraordinary and ſurprizing, and beſides uſhering in new Principles into Opticks, quite contrary to the common and received, it will be hard to perſwade it as a truth, till it be made ſo viſible to all as it were a ſhame to deny it*: if he eſteem it ſo extraordinary, he may have the priviledg of making it ſo viſible to all, that it will be a ſhame to deny it. For, I dare ſay, after his teſtimony no body elſe will ſcruple it. And I make no queſtion but he will hit of it, it being ſo plain and eaſy, that I am very much at a loſs to imagine what way Mr. *Linus* took to miſs. Dat. *Cambridge Feb.* 29. $167\frac{5}{6}$.

An Extract of a Latin Letter of Signor Caſſini, *containing both his Conſiderations upon Mr.* Flamſteed*'s account of the Lunar Eclipſe of* Decemb. 21. 1675 †, *and his own Obſervations of the ſame Eclipſe.*

† See *N.* 121. *p.* 495. of theſe Tracts.

Clariſſimo Viro
Dom. *Henr. Oldenburg* Reg. Soc. à Secretis
J. Dominicus *Caſſinus* S. P.

OBſervatio Lunaris Eclipſis, nocte præcedente diem primam Januarii *anni hujus celebratæ, quam mihi à doctiſſimo* Flamſtedio *communicaſti, inter difficillimas recenſenda eſt. Obliqua quippe Lunæ incidentia in Umbram, in hoc*

parvo Defectu tempora Appulſuum & Emerſionum tam Marginum quàm Macularum effecit incertiora, perplexoſque nonnihil in iis determinandis tenuit Obſervatores, cùm Umbra diu multumque eaſdem raderet maculas, tarduſque eſſet tranſitus à Penumbra denſiori ad totalem Umbram, minimè præciſis terminis cohærentem. Itaque Eclipſin hanc Meridianorum differentiis exactè determinandis prorsùs ineptam cenſuimus, cùm differentia temporum earundem phaſium, diverſis terræ locis notatorum, perplexitates involvat, quæ eodem in loco differentias exhibere ſenſibiles poſſunt.

Nos, quibus per totam Eclipſis durationem Cœli arriſit ſerenitas, cum DD. Richardo *&* Romero *ad Lunam ſimul diverſis Teleſcopiis intenti, communi conſenſu phaſes determinavimus, comparantes Umbram non modò d Maculas ad quas appellebat, ſed etiam ad plures ex maculis circumſtantibus, Umbræ ſitui determinando idoneis, ut ad æquidiſtantes ab Umbra, ad eas quæ caderent in rectâ linea cum cornibus, quorum diſtantiam opportunis temporibus cepimus: quod etiam video à præclaro* Flamſtedio *factum.*

Duo autem præcipua à nobis exactè determinata ſunt, Medium ſc. Eclipſis tempus, ejuſque Magnitudo. Medium deductum eſt non ſolùm ex comparatione Initii & Finis, ſed etiam duarum æqualium Phaſium, determinatu facillimarum, quando ſcil. diſtantia Cornuum æqualis erat Lunæ ſemidiametro, ante Eclipſin captæ, 15'.28": *Scilicet, cùm* Initium *Eclipſis exiſtimatum fuerit* h.2.24'.35". *poſt mediam noctem; Finis verò totalis, relictâ penumbrâ ſimili ac fuerit in determinatione Initii,* 4h. 15'. 25".

Duratio totius Eclipſis provenit	1. 50. 50.
Dimidia	0. 55. 25.
Et Eclipſis medium	3. 20. 0.
Sexta verò circumferentiæ pars abſciſſa eſt	2. 38. 5.
Atque iterum	4. 2. 25.
Intervallum	1. 24. 20.
Dimidium	42. 10.
Hinc Medium Eclipſis	3. 20. 15.

Intra quartam minuti partem priori determinationi conveniens.

Parùm abeſt quin etiam ex D. Flamſtedii *obſervationibus* Medium *Eclipſis pari modo eruatur. Is quippe*

*H.*14.29'.30". *diſtantiam cuſpidum obſervavit* 17'. 16". *Et*

*H.*15.52.45. *eclipſi decreſcente diſtantiam obſervavit* 18. 57, *uno ſcil minuto* 41" *majorem: Itaque* Medium *eclipſis propius eſt poſteriori obſervationi quàm priori.*

Medium tempus inter utramque obſervationem fuit h.15.11'.7". *Tardius igitur aliquanto deducitur hinc Eclipſis* Medium; *unde differentia Meridianorum proveniret minor min-9; quod minimè convenit obſervationibus certioribus Eclipſis præcedentis æſtivæ, ex quibus illam deduxi min.* 10'$\frac{3}{4}$. *Prior obſervatio noſtra cum priore D.* Flamſtedii, *aliquanto tardiore, comparata, differentiam Meridianorum exhibet majorem* 8'. 35". *Poſterior noſtra, tardior obſervatione poſteriore D.* Flamſtedii, *differentiam Meridianorum exhiberet minorem* 9'.40",

Finis

	h.	′	″
*Finis à D.*Flamſtedio *exiſtimatus*	16.	7.	15.
Et à nobis	16.	15.	25.
Differentiam Meridianorum inferret		8.	10.
*Initium à D.*Halleio *Londini obſervatum*	14.	16.	
Cum obſervato à nobis	2.	24.	35.
Differentiam Meridianorum faceret		8.	35.

Ex hac igitur Eclipſi *differentia Meridianorum eruueretur* duobus *circiter* minutis *minor*, *quàm ex* Eclipſi æſtatis *præcedentis*, *quam tamen huic longè præfero*, *non ſolùm ſpectatâ Majori facilitate determinandi tempora Appulſuum & Emerſionum in ea* Eclipſi *totali*, *quàm in hac partiali*; *verùm etiam ob aëris ſerenitatem*, *quâ utique æqualiter uſi fuimus in* ea Eclipſi; *cum in* hac *Pariſiis cœlum ſereniſſimum*, *Londini fuerit ſubnubilum*; *quo nomine Pariſienſes obſervationes Londinenſibus cenſeo præferendas. Differentia autem conſtitutionis Aeris efficit*, *ut Nos limbum Lunæ occidauum in Umbra* 12 *minutis antè determinatum à nobis* Eclipſis *finem videre potuerimus*; *cùm* Flamſtedius *ipſum non niſi in fine videre potuerit.*

Cæterum in Situ umbræ & Eclipſis Magnitudine planè conveuimus. Ab utriſque quippe noſtrùm annotatum eſt, *Umbram nunquam ſuperaſſe* Porphyridem, *licèt is altè in Penumbram fuerit immerſus.* Porphyriti *proximus eſt* Mons parvus albicans, *quem tunc* Ariſtarchi comitem *appellavimus*, *eò quòd ab ipſo ſeu* Porphyrite *vix diſtet ſui diametro. Is monticulus immerſus eſt in umbram* h.2.51′.15″; *emerſit autem* h. 3.8′. 25″, *totoque tempore interjecto fuit Umbra* Porphyriti *proxima.*

Uterque pariter annotavimus, *in ſumma* Eclipſi *Umbram ad* Corſicam *ferè pertigiſſe*, *nunquam tamen ab ea fuiſſe tectam*, *ſed relictum exiguum intervallum*, *cujus termini diſtantia à Lunari margine proximè capta eſt* 8′. 17″; *cùm* Flamſtedius *Inſulæ ipſius paulò remotioris diſtantiam ab eodem limbo invenerit* 8′. 39″. *Inſulam quoque ſeu potius Peninſulam* Macram *utrique umbræ dimidiatè adjacentem conſpeximus*; *nos id fieri cæpiſſe notavimus* h.3.28′.15″, *& per horæ quadrantem in eadem diſtantia perſeveraſſe.*

Hæc dum ſcribo, *redditum mihi eſt cum humaniſſimis literis tuis Diarium Aſtronomicum* *, *à veſtris Aſtronomis ſupputatum*; *percommodum ſanè*, *prævidendiſque Obſervationum opportunitatibus perutile. Erit illud mihi ſemper præ oculis*, *meque ad Obſervationes quas annotat comparabo*, *eaſque Vobis viciſſim communicabo. Vale*, *&c.* Pariſiis *d.* 11. Febr. 1676.

* This is the *R. Almanack*, for the Year 1676, which was ſent him from hence, for the ſake of the Appulſes, calculated, and annexed at the end thereof.

Another Letter from the ſame to Mr. Flamſteed, *upon the ſame Argument.*

Clariſſimo Dom. *Joh. Flamſtedio*, Aſtr. præclariſſimo.

J. Dominicus *Caſſinus* S. P.

COmmunicavit mihi Dom. Oldenburgius *Obſervationes tuas nuperæ Lunaris Eclipſis*, *quas in reſponſione ad ipſum cum noſtris*, *in Regio Obſervatorio habitis*, *me comparaſſe dixi. Duorum vel trium minutorum diſcrimen*

inter

inter utraſque Obſervationes tribuo difficultati determinandi tempora Phaſium in obliqua incidentia in Umbram penumbræ conterminam, differentiæque conſtitutionis Aeris, quem Tu ſub-nubilum, Nos habuimus ſereniſſimum. Ex hâc, Meridianorum differentia erueretur minor quàm ex Eclipſi præcedente, cui tamen ſtandum cenſeo, donec per obſervationes Immerſionum & Emerſionum Satellitum Jovis, quos ad hanc rem exiſtimo maximè idoneos, rem ſcrupuloſius determinemus. Nec enim adhuc in tuam venire ſententiam potui, qui, cùm de uno tantùm minuto quæſtionem moveas, ſequi videris methodum valdè compoſitam deducendi differentiam Meridiani Pariſienſis *à* Londinenſi *ex obſervationibus pluribus diverſi generis, Occultationis nempe Fixæ à Luna,* Londini & Gedani *obſervatæ, & Eclipſis Solis obſervatæ* Pariſiis & Gedani, *in quarum utraque Parallaxis ratio habenda eſt; eamque præferre videris Methodo ſimplici deducendi eandem differentiam ex plurium phaſium ejuſdem Eclipſis,* Londini & Pariſiis *obſervatæ mirifico conſenſu.*

Majorem quoque differentiam Obſervationum provenire poſſe cenſeo ex difficultate diſtinguendi Umbram veram à Penumbra, quàm ex differentia Teleſcopiorum, trium quatuorve pedum longitudinem excedentium. Hæc enim Teleſcopia decimas Minutorum partes ritè diſtinguunt, nec per ſe variabunt indicium temporum Phaſium earundem à maximis plus quintâ horarii minuti parte, cùm perplexitas termini Umbræ veræ unum & alterum minutum temporis quandoque ſuſpenſum teneat Obſervatorem. Nec verò perplexitas hæc magnitudine Teleſcopiorum imminuitur, quemadmodum Umbra remotiſſimi corporis hîc in terris non exactiùs diſtinguitur à Penumbra ab oculo illi proximo, quàm ad certam diſtantiam remoto. Quicquid de hac re ſit, ſpero nos ex Obſervationibus Jovialium, *qui jam mane ritè conſpiciuntur, differentiam Meridianorum exactiùs determinaturos. Vale, Vir Clariſſime, &, ut cœpiſti, rem Aſtronomicam promove. Dab.* Pariſiis *d.* 11. Febr. 1676.

A Copy of a third Letter written by Signor Caſſini, *touching an Occultation of a Fixt Star by the Moon, obſerv'd by the ſame.*

Clariſſimo Viro

D. *Henrico Oldenburg* Reg. Societati in Secretis

J. Dom. *Caſſinus* S. P.

OCcultationem Stellæ ſequentis duarum in ſiniſtro pede poſteriori Leonis à Luna, quam D. Hamſtedius *ſupputaverat, in Regio Obſervatorio cum* D. Romer *exactè obſervavi d.* 29 Februarii.

Fuit Immerſio horâ p.m. 10. 19'. 34". *Immerſionis plaga fuit juxta finem* Schicardi *versùs* Phocilidem *in Selenographia Riccioli.*

Emerſio verò fuit horâ 11. 16'. 40". *in æquali à rectâ diſtantia à* Vendelino & Petavio.

Per puncta Immerſionis & Emerſionis, diligenter notata, ducta recta linea diametrum illi perpendicularem abſcidit in ratione 6'. 45". *ad* 26'. 5".

Fuit autem diameter Lunæ ad Meridianum accedentis 32'. 50".

H. 12. 29'. *margo Lunæ ſuperior fuit in eodem parallelo cum Stella, quæ tunc præcedebat Lunam minuto horario* 1'. 50".

H. 12.

H. 12.40'. 18". *Stella præcedebat marginem occidentalem Lunæ minutis horar.* 2'. 11". *Lunæ diameter pertranſibat* 2'.14".

H. 12.52'.35". *Stella præcedebat eundem marginem* 2'.25".

Altitudo Meridiana limbi inferioris Lunæ capta eſt gr. 39.25'.25".

Rumor hîc percrebuit, viſum Nanneti *Cometam valdè obſcurum inter* Eridanum *&* Leporem. *Nobis, ex quo cœli ſerenitas affulſit, fruſtra quæſitus eſt. Hac verò occaſione inter* Canem majorem *&* Navem *deprehendi* Nebuloſam *viſu pulcherrimam, ſi magnis Teleſcopiis inſpiciatur, ex Stellis confertiſſimis compoſitam, quæ cœlum mediat cum* Cane minori.

Inſpecta quoque mihi eſt Stella nova in ore Ceti, *quæ annos aliquot latuit, Solaribus radiis tempore maximæ fulſionis immerſa; nunc verò Stellas tertiæ magnitudinis facilè ſuperat.*

Obſervationibus etiam Mercurii, *qui nuper è Solaribus radiis emerſit, invigilamus; quod & Aſtronomos veſtros facturos putem. Vale, & has Obſervationes Dom.* Flamſtedio *noſtro, cum officii noſtri ſignificatione, impertire.* Pariſiis *d.*4.Martii 1676.

*Mr.*Flamſteeds *Anſwer to the former three Letters, containing alſo ſome celeſtial Obſervations.*

Viro clariſſimo
Domino Johanni Dominico Caſſino, Aſtron. Regio Pariſino.
Joh. Flamſtedius S. P.

LUnæ ad 33um Leonis *appulſum, ſereno ad votum aere tibi obſervare contigiſſe, valde lætor; quodque eum mihi communicare voluiſti, gratè habeo. Paratus eandem Occultationem præſtolabar; ſed nubes, cœlum undiquaque ferè eâ nocte hîc ſubtegentes, iſtac me felicitate privarunt. Optandum equidem, id utriſque noſtrûm pari tunc ſerenitate arriſiſſe; meliùs quippe ab eadem, accuratè obſervatâ, Meridianorum noſtrorum differentiam inveſtigare potuiſſemus, quàm vel ab Occultatione ultimæ* Geminorum, *Londini & Gedani in Eclipſi Lunæ* Januar. 1.1675. *notatâ, vel ab Eclipſibus Lunæ nuperis, quibus ad id negotiam hactenus uſi fuimus. Differentiæ enim, ab Ecclipſi Lunæ* Junii 27.1675. Londini *&* Pariſiis *obſervatâ, deductæ, vix fidere poſſum; quippè, licèt tempora phaſium à* Vobis *obſervatarum accuratiſſimè determinata credam;* Ego, *cùm amplior non ſuppeteret, Quadrante uſus fui* 20 *tantùm digitorum radio, ad horologium corrigendum, quique nuda duntaxat habuit pinnacidia; & propterea de momento phaſis alicujus certior eſſe vix potui quàm ad unum minutum horarium. Noviſſimam Eclipſin* Decemb. 22. *inſtructior obſervavi; cùm tamen mihi aer ſubnubilus extiterit, &, propter obliquam Lunæ in Umbram terræ incidentiam, tardiſſimus fuerit ejus ad Maculas appulſus, minùs apta fuit hæc Eclipſis huic negotio. De Occultatione ultimæ* Geminorum, *quam cum* Streetio *noſtrate* Edmund.Hallejus *obſervarat, quaque ad differentiam Meridianorum* Londini *&* Gedani *uſus ſum, cùm* Hallejum *interrogarem, ingenuè faſſus eſt, nec accuratè admodum, nec ſatis ampli Inſtrumentis obſervationem eam factam fuiſſe. Incerta igitur inter duo minuta horaria manet etiamnum Meridianorum noſtrorum*

diffe-